Scientists have oriented themselves mostly on observing the Universe.

What about listening the Universe?

What is a sound?

It is a wave travelling through the physical medium. Actually, it is a distortion of the local region of the medium. Can wave travel through the Universe? Yes but not the sound wave since there is no physical medium - only vacuum energy and (quantum) field(s). Therefore, just the EM waves can propagate through the Cosmos. Those with the longest wavelenghts - radio waves - can even penetrate a black hole. Yet, inside galaxie clusters clouds of gas are floating around. Here is our medium! We just need to rescale the sample quadrillion times up (higher) going tens of octaves deeper (for comparison: an 88-key piano plays seven octaves).

There is a technique called "sonification". It is a method of data perceptualization which simple example is the Geiger counter. You can laugh but back in 1971. using Geiger counters space explorers have detected the Cygnus X-1 (HDE 226868), a rotating black hole, producing peak flow density of 2.3 x 10`3 Jy (jansky) at the distance of an approx. 7200 ly from the Earth.

Who is Karl Guthe Jansky?

One of the pioneers of the radio astronomy, Jansky detected radio waves coming from the misterious source in the center of the Milky Way. Milky Way - that is our home galaxy. He found some strange radiation emanating from the Sagittarius A* located some 26,000 ly from us.

Unprecedentedly disturbing noise causing instant chills in the human nervous system temporarily paralysing an unsuspecting individual.

Low yet deep, creepy roar of an ancient cosmic Behemoth, the real Dark Knight capable of devouring an entire galaxy. Which… could be our unfortunate destiny if we don`t make Dyson sphere in time.

Converting the material collected with the Chandra X-ray telescope, in recent decades, NASA astronomers translated the pressure waves emitted by the supermassive black holes in the Perseus, M87 and Milky Way galaxies

causing disturbances in the surrounding gas.

https://chandra.si.edu/sound/

What is the main difference between light and sound waves besides sounds being mechanical not electromagnetic? Sound waves have much longer wavelenghts and much lower frequencies. Accordingly, sound waves carry much less energy.

Audio waves were discovered by Leonardo Da Vinci while Galileo Galilei made analysis of a sound properties.

Heinrich Rudolf Hertz first proved the existence of an electromagnetic waves theoretically postulated by the James Clerk Maxwell in his equations of electromagnetism.

Speed of the sound in air, at sea level and with temperature of 15 Celsius, is

1225 km/h.

Winds of Neptun travel 1,931 km/h which means they blow faster than the speed of sound. Imagine their loudness.

Ernst Mach introduced an equation relating an object`s movement velocity and speed of the sound which can be equal to 1 Mach, subsonic (less than 1 Mach) or supersonic (above 1 Mach).

M = vm / vs

M = Mach

vm = object`s movement velocity

vs = speed of the sound

Sound frequency is a rate of waves passing through a determined point.

$f = v / \lambda$

f = frequency

v = speed of the sound

λ = wavelenght

Remember the formula for the light frequency?

$f = C / \lambda$

Hence, same formula applies for both the light and a sound frequency. Meaning that a main difference is also a main likeness between this two.

Is there a better way to learn something than doing it by yourself?

The praxis (experience) is the best tutor.

I will use Windows Media Player to play my favourite tune and discover what are the properties of the sound.

First thing that interests me is a "decibel" unit, since we use "volume" effect most often. We already know it describes the loudness of the sample: more decibels mean the sound will be louder while less decibels mean the sound will be lower. Hence, "decibel" unit obviously has to be related to the power of the noise output.

Decibel is a unit used for expressing the sound intensity. The decibel scale is

logarithmic. Sound intensity unit is Watt per square meter (W/m2).

$SI = 10\ db \times \log (I / I0)$

SI = sound intensity (volume or loudness)

db = decibel

log = logarithm

I = intensity of the sample

I0 = refference intensity in used medium

(to be continued in a few days)